

MSW-2000P Series

Studio Editing Recorders

MPEG **IMX**

# Enabling the present, protecting the past.

The New MSW-2000P Series Studio Recorders.



this is not a rehearsal.

[www.pro.sony-europe.com](http://www.pro.sony-europe.com)

**SONY**

# Exploit the full business MPEG env MSW-2000P Series

In the digitally based broadcast industry of today and tomorrow, only the fittest enterprises will grow and prosper. In short, those that deliver the quality, flexibility, choice and value - that an ever more demanding audience requires.

Whatever your medium, from satellite or terrestrial to cable; and whether you operate locally, nationally or internationally, networked systems based upon open MPEG-2 compression, can deliver what's required at every step of the programme production chain.

Hence the rapid increase in the popularity of MPEG-2 based systems. The advantages of this technology are felt at every stage of the process. Not only is MPEG-2 the worldwide standard for digital programme delivery via DTV, DVB and DVD, it is also widely used for the contribution and distribution of material between studio centres.

In addition, MPEG-2 4:2:2P@ML is also a firm favourite for programme production. Thus the number of linear and non-linear options based upon this system continues to increase dramatically.

MPEG-2 brings a number of pivotal benefits to your organisation.

These range from its versatility - optimising quality and cost for each programme application; interoperability - bringing you an extensive choice of equipment from multiple suppliers and the reassurance of a future-proof investment.

Today as broadcasters begin to reap the full advantages of MPEG-2 technology, they are demanding the resources to produce programmes of the very highest quality using recording systems that are also based upon open compression and interfacing standards.

In anticipation of this requirement, Sony has introduced a new family of MPEG IMX™ Studio Editing Recorders based upon MPEG-2 4:2:2P@ML data compression at 50Mb/s intra-frame - the MSW-2000P Series.

Developed from Sony's unique experience of, and world renowned reputation for, 1/2" recorders : Betacam, Betacam SP, Digital Betacam and Betacam SX, the MSW-2000P Series ensures compatibility with all Betacam-based tape libraries and facilities.

So not only is this exciting new range the ideal tool for migrating to an open MPEG-2 environment - quickly, simply and cost effectively; it is perfect for protecting your investment in current 1/2" resources.

benefits of an end-to-end  
environment with  
**MPEG IMX™**  
Studio Editing Recorders.



## Enter the Open World of MPEG-2 with MPEG IMX™ Recorders

MSW-2000P Series MPEG IMX™ Studio Recorders are more than just ideal tools on which to base your open MPEG-2 infrastructure. They also play a vital role in migrating your existing operations to MPEG-2.



DNW-A225P/A220P/A25P  
Betacam SX Digital Portable Editors



DNW-7P/9WSP/90P/90WSP  
Betacam SX Camcorders



DNW-A28P  
Betacam SX Digital Portable Recorder



DVW-707P/709WSP/790WSP  
Digital Betacam Camcorders



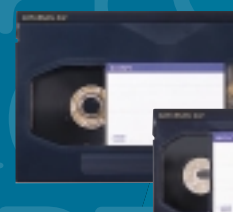
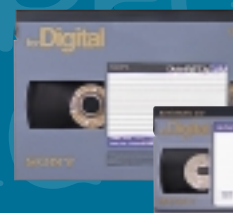
DVW-250P  
Digital Betacam Portable VTR



BVW-D600P/400AP/300AP  
Betacam SP Camcorders



DVCAM Camcorders





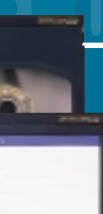
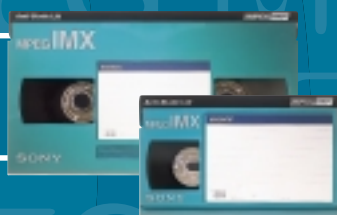


**Betacam SX**  
Small and Large Cassette

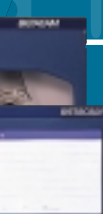


**Digital Betacam**  
Small and Large Cassette

**MPEG IMX**  
Small and Large Cassette



**Betacam SP**  
Small and Large Cassette



**Betacam**  
Small and Large Cassette



**DVCAM**  
Mini and Standard Cassette



**DNW-A75P/75P/**  
**MPEG 50Mb/s o**

- Betacam SX Playback
- Betacam SP Playback
- Betacam Playback

**DSR-2000P + Op**  
**MPEG 50Mb/s o**

- DVCAM Playback
- DV Playback
- DV LP Playback
- DVCPRO Playback

# MPEG W

## MSW-A2000P

MPEG 50 Mb/s over SDTI-CP I/O

- MPEG IMX Recording and Playback
- Betacam SX Playback
- Betacam SP Playback
- Betacam Playback



## MSW-M2000P

MPEG 50 Mb/s over SDTI-CP I/O

- MPEG IMX Recording and Playback
- Digital Betacam Playback
- Betacam SX Playback
- Betacam SP Playback
- Betacam Playback



## MSW-2000P

MPEG 50 Mb/s over SDTI-CP I/O

- MPEG IMX Recording and Playback
- Betacam SX Playback



SDTI-CP



MAV-555  
Multi Access Video Disk Recorder



MAV-2000  
Multi Access Video and Audio Recorder



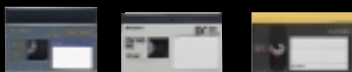
Other manufacturers' decks  
with SDTI-CP I/O

**A65P/65P Series + BKNW-124 SDTI-CP Output Board**  
over SDTI-CP output for following:

Deck  
Deck (A75P/A65P)  
(A75P/A65P)



**Additional DSBK-210 SDTI-CP Output Board**  
over SDTI-CP output for following:



# World



recorder



o Server



ervers



DNE-2000  
Nonlinear Editor



MSW-2000P Series  
MPEG IMX Studio Editing Recorders



MPEG Transcoder



Other manufacturers NLE or  
servers with SDTI-CP I/O



MAV-70XGI  
Transmission Server



BDX-2300  
BDX Interface Unit



BDX-N1000  
Network Interface Unit



# Main features of the MSW-2000P Series MPEG IMX™ Recorders

## MPEG-2 50Mb/s, I-frame compression

The MSW-2000P Series employs 8-bit 4:2:2 component video sampling and MPEG-2 4:2:2P@ML data compression at 50Mb/s, I-frame. This provides very high picture quality and excellent multi-generation performance.

## MPEG-2 bit stream over SDTI-CP

MSW-2000P Series recorders can input and output an MPEG-2 Elementary Stream via SDTI-CP (SMPTE 326M), enabling the transfer of data to other MPEG devices, such as non-linear editors and servers.

## Compact design

The Series features a compact 4U-size design - 174 x 427 x 550 (H x W x D) - and weighs only 22kg.

## Elegant front panel design

MSW-2000P Series recorders offer two major innovations in front-panel design, while retaining the familiar operational controls of recorders such as Betacam SP, Betacam SX and Digital Betacam. A clear multi-function display provides comprehensive information, allowing quick access and easy control of a variety of functions. Additionally, dedicated controls are included for each of the eight, independently editable audio channels.

## High-quality digital audio

MSW-2000P Series recorders provide eight, independently editable, 16-bit 48kHz channels as standard. They can also be switched to provide four channels of 24-bit 48kHz digital audio.

## Long recording and playback times

MSW-2000P Series recorders provide long recording and playback times.

- 220 (625)/184 (525) minutes - L cassette
- 71 (625)/60 (525) minutes - S cassette

## 525/60, 625/50 switchable operation

MSW-2000P Series recorders offer 625/525 switchable operation for all playback-compatible 1/2-inch formats.

\*For playback of 525 line Betacam SP tape in 625 machines and vice versa, the analogue composite outputs are for monitoring purposes only.

- Analogue composite I/O







## Versatile interfaces

- Analogue component I/O
- SDI I/O
- SDTI-CP I/O
- Analogue audio (4 ch)
- AES/EBU audio (16 bit - 8 ch/24 bit - 4 ch)
- Audio monitor (2 ch)

All equipped as standard.

## Easy maintenance

Most of the electronic circuitry of the MSW-2000P Series is arranged on plug-in boards for quick and easy maintenance. The drum assembly and tape transport have been designed to provide low-cost maintenance and ensure rugged and reliable operation. An upper drum mechanism has been used to significantly reduce the time required for periodic scanner replacement.

MPEG IMX™ Format	
<b>General</b>	
Tape width	12.65 mm (1/2-inch)
Tape material	Metal Particle tape
Recording/Playback time	Max. 184 (525)/220 (625) with L cassette
Tape speed	64.467 (525)/53.776 (625) mm/s
Track pitch	21.7 µm
Tracks per frame	8 tracks/frame
Longitudinal tracks	Time code/Control
Playback compatibility	
MSW-M2000P	Betacam, Betacam SP, Betacam SX, Digital BETACAM
MSW-A2000P	Betacam, Betacam SP, Betacam SX
MSW-2000P	Betacam SX
<b>Video</b>	
Compression	MPEG-2 4:2:2P@ML, Intra frame coding (ISO/IEC 13818-2000)
Video bit rate	50 Mb/s
Active lines per frame	512 (525)/608 (625)
Sampling frequency	Y: 13.5 MHz, R-Y/B-Y: 6.75 MHz
Quantization	8 bits/sample
Error correction	Reed-Solomon
<b>Audio</b>	
Compression	None
Sampling frequency	48 kHz
Quantization	16 or 24 bits/sample (selectable)
Channels	8 or 4
Data recording capability	Yes
Error correction	Reed-Solomon



# Operational features of MSW-2000P Series

## MPEG IMX™

### Frame-accurate insert/assemble editing

Video and any of the 8 channels of digital audio can be edited independently. Editing is to  $\pm 0$  frame accuracy.

### Pre-read editing

Pre-read editing is a standard feature of all MSW-2000P Series recorders. This significantly speeds up the editing process and simplifies operations such as titling, video layering and audio sweetening.

### Wide variable speed range

- MPEG IMX™ cassette: -1 to  $\pm 3$  times
- Digital Betacam cassette: -1 to  $\pm 3$  times
- Betacam SX cassette: -1 to  $\pm 2$  times
- Betacam, Betacam SP cassette: -1 to  $\pm 3$  times

With noiseless image and Digital Jog Sound.

### High speed picture search

Shuttle search speed

- MPEG IMX™ cassette:  
 $\pm 78$  times normal play speed
- Digital Betacam cassette:  
 $\pm 50$  times normal play speed
- Betacam SX cassette:  
 $\pm 78$  times normal play speed
- Betacam, Betacam SP cassette:  
 $\pm 42$  times normal play speed

### Dynamic motion control

For programmable slow-motion playback from the recorder control panel, or from external edit controllers.

### Shot marks

Tapes containing Shot Marks can be scanned by the MSW-2000P Series. The position of each Shot Mark can be automatically detected and - after scanning - can be displayed on a monitor. This allows fast and easy cueing to any mark.

### Multi-segment record capability for use in Flexicart and LMS systems

For easy and low cost integration into existing "on-air" facilities

### Optional accessories

With all the interfaces provided as standard, the number of accessories to the MSW-2000P Series has been kept to a minimum. Options are shown below:

- Remote control panel
- RCC-5G Remote cable
- RMM-130 Rack mount kit
- Maintenance manual
- MPEG IMX™ Video cassettes\*

BCT-6MX (7) / 12MX (14) / 22MX (26) / 32MX (38) / 60MX (71) (small)

BCT-64MXL (76) / 94MXL (112) / 124MXL (148) / 184MXL (220) (large)

\* 625 record duration shown in brackets



# Specifications

		MSW-A2000
<b>General</b>		
Power requirements		AC 100 to 240 V, 50/60 Hz
Power consumption		2A (200 W) / AC 240 V
Operating temperature		+5 ° to +40°C (+41° to +104°F)
Storage temperature		-20° to +60°C (-4° to +140°F)
Humidity		20 % to 90 % (relative humidity)
Mass		22.0 kg (48 lb 7 oz)
Dimensions (W x H x D)		427 x 194 x 544 mm (16 7/8 x 7 3/4 x 21 1/2 inches)
Tape speed	MPEG IMX™ Betacam SX Betacam/Betacam SP	64.467 (525)/53.776 (625) mm/s 59.515 (525)/59.575 (625) mm/s 118.6 (525)/101.51 (625) mm/s
Digital playback time		Max. 184 (525)/220 (625) min with BCT-184MXL cassette
Fast forward/rewind time		Approx. 3 min with BCT-184MXL cassette
Search speed range	MPEG IMX™ Betacam SX Betacam/Betacam SP	±78 times normal playback speed ±78 times normal playback speed ±35 (525)/±42 (625) times normal playback speed (Betacam/Betacam SP)
Servo lock time		0.5 (NTSC)/0.7 (PAL) s or less (from standby on)
Load/unload time		4.5 (S-cassette)/5.5 (L-cassette) s or less
<b>Inputs/Outputs signal</b>		
Analog composite input		BNC ( x 2), 1.0 Vp-p, 75 Ω, sync negative
Analog composite output		BNC ( x 3, including one character out), 1.0 Vp-p, 75 Ω, sync negative
Analog component input		BNC ( x 3, for 1 set, Y/R-Y/B-Y), Y: 1.0 Vp-p, 75 Ω, sync negative, R-Y/B-Y: 0.7 Vp-p, 75 Ω
Analog component output		BNC ( x 3, for 1 set, Y/R-Y/B-Y), Y: 1.0 Vp-p, 75 Ω, sync negative, R-Y/B-Y: 0.7 Vp-p, 75 Ω
SDI input		BNC ( x 2, including one active through out), SMPTE 259M (ITU-R BT.656-3), 270 Mbit/s
SDI output		BNC ( x 3, including one character out), SMPTE 259M (ITU-R BT.656-3), 270 Mbit/s
SDTI-CP input		BNC ( x 1), SMPTE 305M (SDTI), 326M (SDTI-CP)
SDTI-CP output		BNC ( x 2), SMPTE 305M (SDTI), 326M (SDTI-CP)
Analog audio input		XLR ( x 4) (4CH :channel selectable)
Analog audio output		XLR ( x 4) (4CH :channel selectable)
Digital audio input (CH 1/2, 3/4, 5/6, 7/8), AES/EBU		BNC ( x 4), default 48 kHz ( 32 to 48 kHz with Sample rate converter)
Digital audio output (CH 1/2, 3/4, 5/6, 7/8), AES/EBU		BNC ( x 4), 48 kHz fixed
Remote control Remote	(RS-422A) RS-232C (ISR*) Parallel remote Video control (1) Control panel	D-sub 9-pin ( x 2), Sony 9-pin remote interface D-sub 9-pin ( x 1), RS-232C interface D-sub 50-pin ( x 1), female D-sub 15-pin ( x 1), female Circular connector 10-pin, female
Reference input		BNC ( x 2) ( VBS or VS) (including one through out)
Time code input		XLR ( x 1), female
Time code output		XLR ( x 1), male
Memory card insertion slot		PCMCIA ( x1)
Monitor output L/R		XLR ( x 2) (channel selectable)
<b>Processor adjustment range</b>		
Video level		±3 dB/ - ∞ to +3 dB selectable
Chroma level		±3 dB/ - ∞ to +3 dB selectable
Black level		±30 IRE/±210 mV
Chroma phase		±30°
System sync phase		±15 μs
System SC phase		±200 ns
Y/C delay		±100 ns ( Betacam/Betacam SP playback only)
Composite input level		±3 dB
<b>Digital video performance</b>		
Sampling frequency		Y: 13.5 MHz R-Y/B-Y: 6.75 MHz
Quantization		8 bits/sample
Error correction		Reed-Solomon code
Digital input to analog component output		K-factor ( 2T pulse): 1 % or less
Analog component input to analog component output		A/D and D/A quantization: 10 bits/sample Bandwidth: Y: 0 to 5.75 MHz +0.5/-2.0 dB, R-Y/B-Y: 0 to 2.75 MHz +0.5/-2.0 dB S/N ratio: 56 dB or more K-factor ( 2T pulse): 1 % or less LF non-linearity: 3.0 % or less
Analog composite input to analog composite output		A/D and D/A quantization: 10 bits/sample Bandwidth: 0 to 5.75 MHz +0.5/-2.0 dB S/N ratio: 53 dB or more Differential gain: 2 % or less Differential phase: 2° or less Y/C delay: 20 ns or less K-factor (2T pulse): 1 % or less
<b>Digital audio performance</b>		
Sampling frequency		48 kHz (synchronised with video)
Quantization		16 or 24 bits/sample (selectable)
Analog input to output A/D and D/A quantization		20 bits/sample
Frequency response (0 dB at 1 kHz)		20 Hz to 20 kHz +0.5 dB/-1.0 dB
Dynamic range (at 1 kHz, emphasis ON)		More than 90 dB
Distortion (at 1 kHz, emphasis ON, reference level)		Less than 0.05%
Cross talk (at 1 kHz, between any two channels)		Less than -80 dB
Wow & flutter		Below measurable level
Head room		20 dB (18 dB selectable)
Emphasis (ON/OFF selectable in REC mode)		T1=50 μs, T2=15 μs
<b>Supplied accessories</b>		
Remote cable (RCC-5G)		x 1
PSW 4 x 16 Rack mount screws		x 4
Operation manual		x 1
Installation manual		x 1

\*ISR: Interactive Status Reporting

**SONY®**

## Sony Broadcast & Professional Europe Studio Editing Recorders